APPENDIX B: OCTOBER 2016 ADEQ RESPONSE TO EPA COMMENTS

ADEQ
ARKANSAS
Department of Environmental Quality

October 12, 2016

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U.S. EPA Region 6
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Subject: EPA's Modeling Protocol Feedback for Independence County, Arkansas (Entergy Independence Power Plant & FutureFuel Chemical Company Combined SO_2 NAAQS Demonstration)

Dear Ms. Mohr:

Thank you for your email, dated September 29, 2016, that provided ADEQ with additional Modeling Protocol and Adjusted_U* Request feedback for the EPA's requested SO_2 attainment modeling that simultaneously simulates SO_2 emissions from Entergy's Independence Power Plant (Entergy Independence) and the Futurefuel Chemical Company (FutureFuel), both located in Independence County Arkansas. We have evaluated your comments, along with those provided by Robert Imhoff and Guy Donaldson in a phone conversation and email on July 14, 2016 and a follow-up conference call[1] with the EPA Region 6 and the EPA Model Clearinghouse that occurred on August 18, 2016. In the July 14, 2016 phone call/email and the August 18, 2016 follow-up conference call, EPA provided the Modeling Protocol and Adjusted_U* Request feedback that:

> *..."to get a MCH concurrence we will need additional information."..."to establish a firm link between the science on which Adj_U* option is based and the individual source/receptor situation of an application." Specifically including an evaluation of the locations of the receptors where significant change occur (to confirm that it is an elevated terrain issues) and what the change in the actual u* value was when concentrations were reduced using the beta option (to confirm that the adjustment via the beta option is the reason for the concentration reductions)."*

Also during the August 18, 2016 follow-up conference call, ADEQ asked if, in addition to the necessary Adjusted_U* Request sensitivity analysis the EPA had any other comments – no additional comments were provided and ADEQ proceeded.

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[1] Conference Call participants included: Guy Donaldson, George Bridgers and Ashley Mohr from the EPA; Will Montgomery, Mark McCorkle and David Clark from ADEQ; Jay Haney and Sharon Doulgas from ICF Jones and Stokes (representing ADEQ); Philip Antici from FutureFuel; Chuck Buttry and John Becherer from Trinity Environmental; and David Triplett from Entergy Arkansas.

As EPA will recall, Entergy's Independence facility was a 2010 SO_2 NAAQS Data Requirements Rule[2] second-round facility[3] and FutureFuel was a third-round facility[4,5]. Per the DRR Round 2 schedule, on September 11, 2015, Arkansas submitted to the EPA a recommendation of "Attainment" for Independence County and supportive AERMOD modeling files for Entergy Independence; however due to "insufficient information" the EPA designated Independence County as "Unclassifiable"[6] and requested that both Entergy Independence and FutureFuel be modeled together to provide the additional information that the EPA needed to make a final attainment designation – bringing FutureFuel from the third-round DRR schedule and into the second-round to be modeled simultaneously with Entergy Independence.

This EPA request to ADEQ for more information in the form of a combined Entergy Independence and FutureFuel combined modeling demonstration prompted ADEQ to submit an SO_2 Designation AERMOD Modeling Protocol and Model Clearinghouse Adjusted_U* Request to the EPA on April 27, 2016 that proposed to model the combined SO_2 emissions from both facilities.

As update to the above July 14, 2016 and August 18, 2016 conversations among the EPA, ADEQ and the involved facilities, FutureFuel's SO_2 emissions have been modeled with the Adjusted_U* Beta option toggled on and off, individual receptors have been compared and a draft sensitivity analysis report is circulating among ADEQ, FutureFuel, Entergy Independence and the involved consultants.

With regard to the September 29, 2016 Modeling Protocol and Adjusted_U* Request comments email that provided ADEQ with additional Modeling Protocol and Adjusted_U* Request feedback (in **Bold**), ADEQ submits the below responses (in *Italics*):

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[2] "Data Requirements Rule for the 2-10 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality standard (NAAQS); Final Rule," 80 *Federal Register* 51052, August 21, 2015.

[3] Janet G. McCabe signed EPA Letter to ADEQ dated March 20, 2015 concurring with ADEQ that Entergy Independence and Entergy White Bluff meet the criteria for an ADEQ recommendation submittal date of September 18, 2015 and an EPA Final Designation date of July 2, 2016.

[4] Stuart Spencer signed ADEQ Letter to EPA dated January 8, 2016 identifying FutureFuel Chemical Company, Flint Creek Power Plant and Plum Point Energy Station as "Round 3" facilities.

[5] Wren Stenger signed EPA Letter to ADEQ dated March 21, 2016 concurring with ADEQ that FutureFuel Chemical Company, Flint Creek Power Plant and Plum Point Energy Station meet the criteria for an ADEQ recommendation submittal date of January 13, 2017 and an EPA Final Designation date of December 31, 2017.

[6] Gina McCarthy signed Letter to Arkansas dated June 30, 2016 establishing Independence County as "Unclassifiable".

EPA's General Comments

EPA General Comment 1 – "The protocol indicates that meteorological data, background concentrations, and emissions information for 2012-2014 will be used in the analysis. If available, we suggest conducting the modeling with the latest 3 years of data (2013-2015). If the data period is not updated, we request that information be provided to support that the 2012-2014 data period is representative of the most recent 3 year period."

ADEQ General Response 1 – This project began with gathering and formatting meteorological, background and emissions data prior to the September 11, 2015 Round 2 submission to the EPA of the Entergy Independence (Independence County) attainment recommendation and supportive AERMOD modeling files. Subsequent work included the ADEQ submission on April 27, 2016 that proposed to model Entergy Independence and FutureFuel simultaneously and to request the authorization to employ the Adjusted_U Beta option – the sole EPA response, provided on July 14, 2016 and August 18, 2016, to this ADEQ submittal was that a sensitivity analysis would also be required from ADEQ and ADEQ proceeded acknowledging this comment. For ADEQ and involved facilities to now begin gathering and formatting 2013-2015 data would cause ADEQ to, in effect, be aiming at a moving target within a very limited timeframe. Therefore, here ADEQ addresses the option of "If the data period is not updated, we request that information be provided to support that the 2012-2014 data period is representative of the most recent 3 year period." with the following information for: 1) meteorological data, 2) background concentrations and 3) emissions information that will also be included in the Attainment Demonstration Modeling Report.*

1) Meteorological Data: For the Little Rock Airport (the source of Meteorological data inputs), the distribution of wind speed and direction is nearly identical for both three-year periods. There is a slightly greater proportion of southerly winds (from the south) for 2012-2014 (Figure 1) compared with the later overlapping three-year period and a slightly greater proportion of northeasterly winds for 2013-2015 (Figure 2) compared to the prior overlapping three-year period. In both cases, the average wind speed is approximately 3 meters per second (m/s) and winds are calm approximately 20 percent of the time.

Figure 1: Wind Speed and Wind Direction Frequency for 2012-2014 for the Little Rock Airport / Adams Field

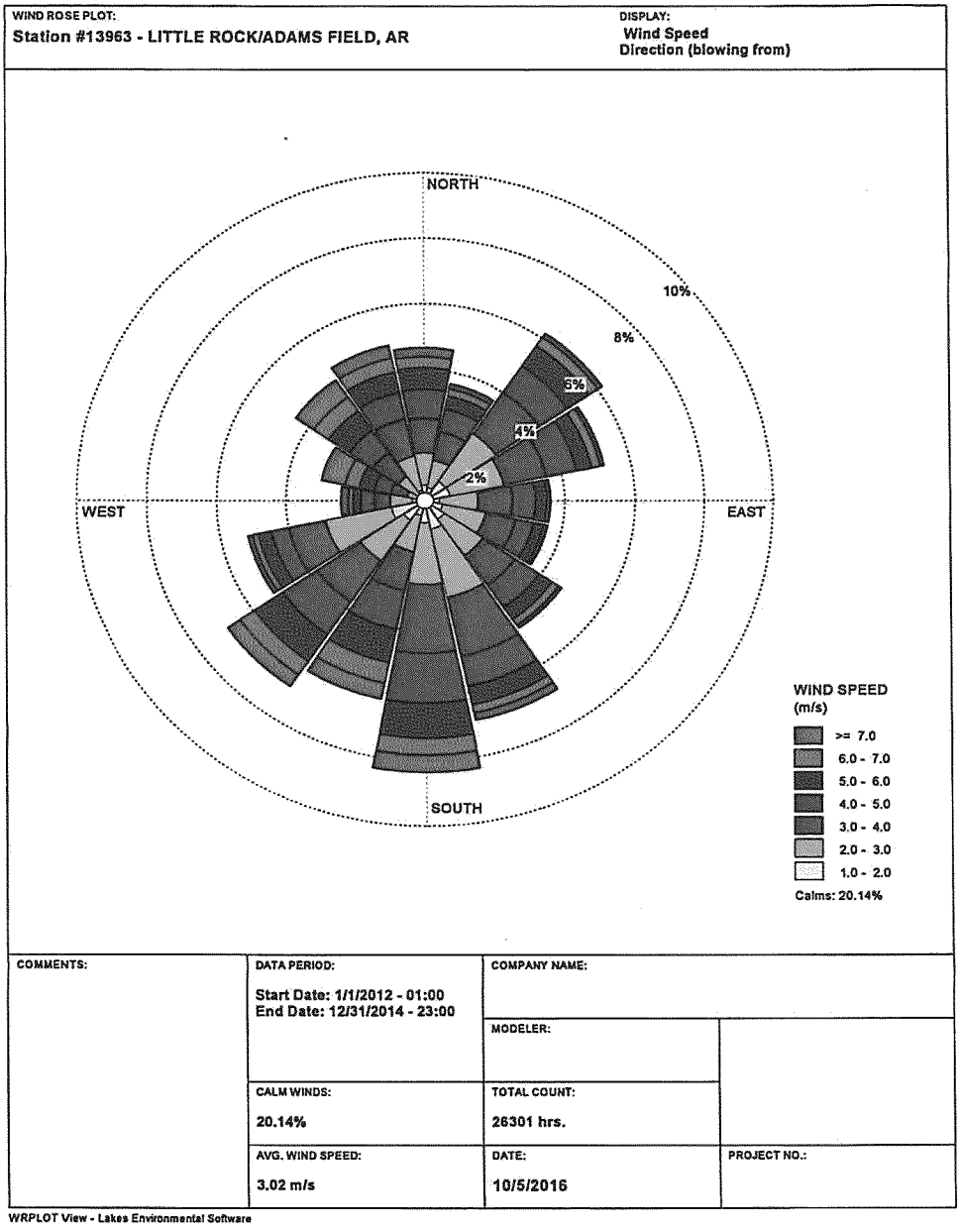
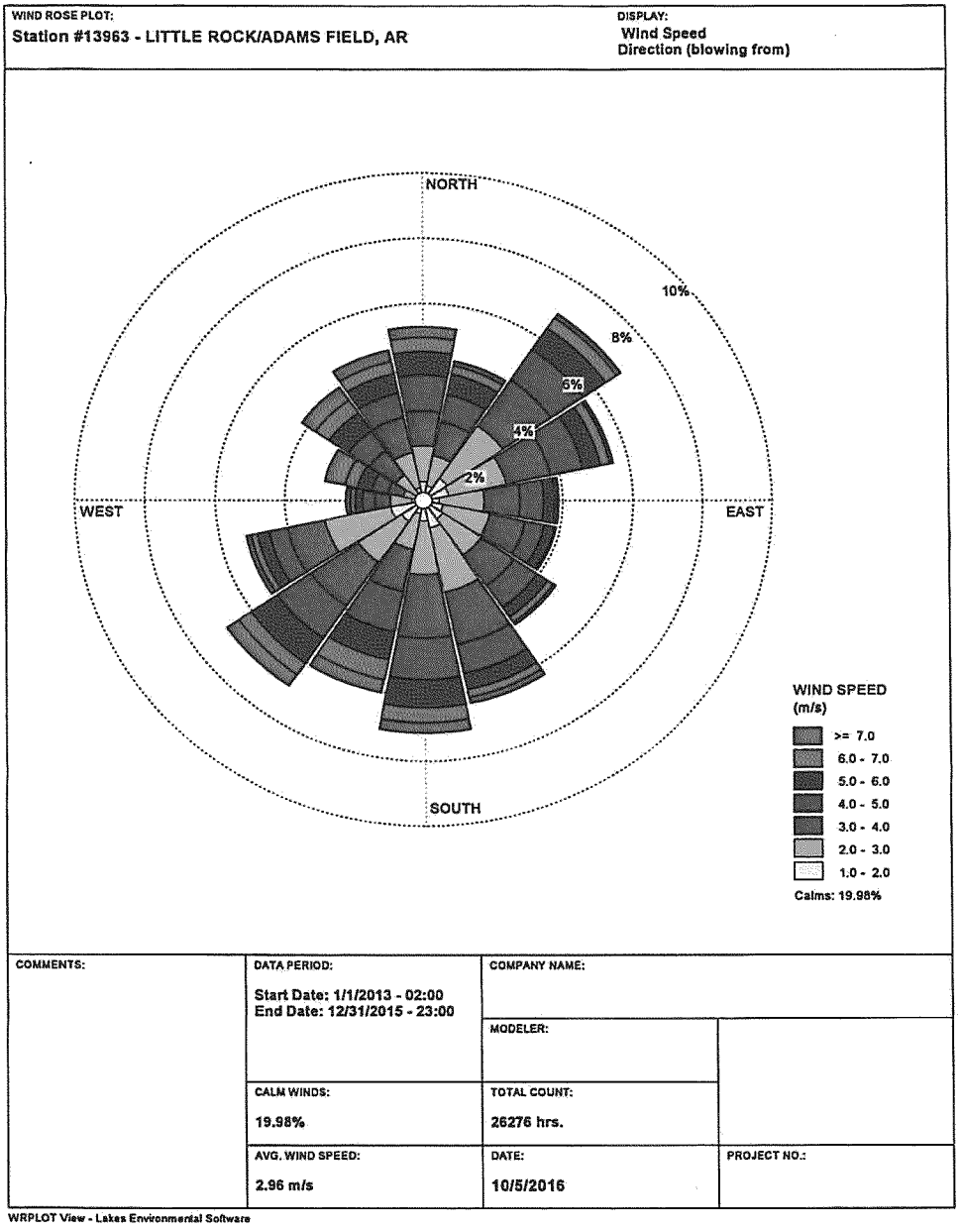


Figure 2: Wind Speed and Wind Direction Frequency for 2013-2015 for the Little Rock Airport / Adams Field

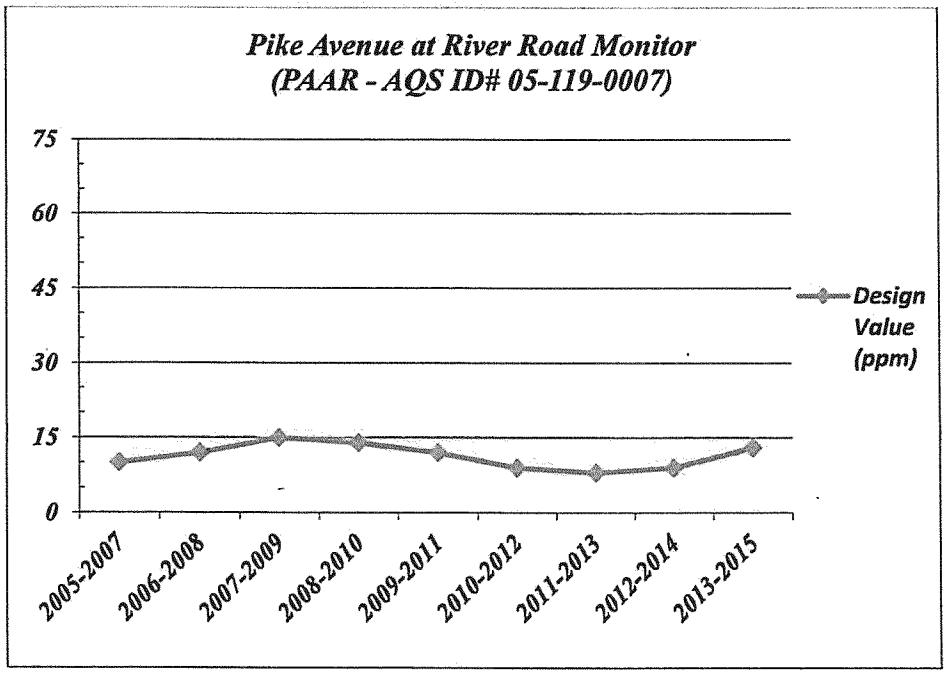


2) Background Concentrations: The Pike Avenue at River Road Monitor (PAAR - AQS ID# 05-119-0007), which is the monitor from which background concentrations have been generated, indicates very little difference (4 ppm) in Design Values between 2012-2014 and 2013-2015 (Table 1 and Figure 3). Therefore, utilizing data that was generated at the beginning of this project, prior to the initial submission to EPA on September 11, 2015, as opposed to now gathering and formatting updated data should not cause any difference in the modeled outcome.

Table 1: Background Concentrations for 2012-2014 and 2013-2015 Design Values for the Pike Avenue at River Road (PARR) Monitor (AQS ID# 05-119-0007)

PAAR Monitor AQS ID# 05-119-0007	**2005-2007**	**2006-2008**	**2007-2009**	**2008-2010**	**2009-2011**	**2010-2012**	**2011-2013**	**2012-2014**	**2013-2015**
Design Value (ppm)	**10**	**12**	**15**	**14**	**12**	**9**	**8**	**9**	**13**

Figure 3: Background Concentrations for 2012-2014 and 2013-2015 Design Values for the Pike Avenue at River Road (PARR) Monitor (AQS ID# 05-119-0007)



3) Emissions Data: Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO2) Primary National Ambient Air Quality Standard (NAAQS); Final Rule

Because emissions data for the current project has been collected, formatted and input into AERMOD, for both the original September 11, 2015 Attainment Designation submission and the current sensitivity analysis, ADEQ proposes that the following provision[7] in the DRR requires annual updates of emissions data:

> *"For areas that were characterized using air quality modeling, the ongoing data requirement applies only where the modeling was based on actual emissions and where the area has not subsequently received a nonattainment designation. In such cases, the air agency will be required to submit an annual report to the EPA providing updated emissions information and recommending to the EPA whether further modeling is warranted to assess any expected changes in recent air quality."*

EPA General Comment 2 – "As you are aware, the release of a new version of AERMOD is anticipated in the near future (along with the final revisions to Appendix W). While significant changes in modeled results are not expected to occur from the change in model versions, we suggest either updating the analysis once the new version is released or conducting a sensitivity run for one of the modeled years to confirm the new model version does not affect your determination regarding the SO_2 designation for the area."

ADEQ General Response 2 – Like the EPA, ADEQ does not expect any appreciable change in results from a new version of AERMOD. If a new version of AERMOD is released prior to completion of the current project, ADEQ would evaluate the feasibility of utilizing the new version.

EPA General Comment 3 – "The proposed meteorological stations and background monitoring stations are suitable for the modeling conducted for Independence County."

ADEQ General Response 3 – Duly noted.

EPA General Comment 4 – "Based on our review of recent EI data, no additional large sources of SO_2 are located nearby. Therefore, the inclusion of the DRR facility sources only is appropriate."

ADEQ General Response 4 – Duly noted.

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[7] Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO2) Primary National Ambient Air Quality Standard (NAAQS); Final Rule (80 FR 51054-51055)

EPA General Comment 5 – "As part of the final modeling report, we expect to see additional information regarding how the actual emission rates are determined. Specifically, if these are based on emissions monitoring or based on calculations using operational data. If calculated, the final modeling report should include information to support the calculated emission rates, including the underlying operational data and calculations relied upon. If monitored emission rates will be modeled, such as CEMS data, information regarding the presence of mission data should be provided along with an explanation of how missing emissions data will be replaced."

ADEQ General Response 5 – Actual emissions for both Entergy Independence and FutureFuel are used in the current modeling project (except FutureFuel's Thermal Oxidizer where the permitted allowable emissions are used; also see ADEQ Specific Response 1 below) and are calculated from both facility CEM systems data and operational data. Documentation that includes calculations of actual emissions will be provided in the Final SO_2 Attainment Designation Modeling Report.

EPA's Specific Questions

EPA Specific Question 1 – "The modeling protocol indicates that allowable emission rates will be modeled for all sources except the Thermal Oxidizer located at the Future Fuels facility. Could you provide additional information regarding why allowable emissions will not be modeled for this particular source? Is it a matter of data availability or information required to calculate an actual emission rate?"

ADEQ Specific Response 1 – EPA may have misread the SO_2 Designation AERMOD Modeling Protocol and Model Clearinghouse Adjusted_U Request submitted to the EPA on April 27, 2016. Each FutureFuel modeled emission point uses actual 2012-2014 emission rates, except the Thermal Oxidizer (TO), which uses permitted allowable emissions. The TO is permitted for 3.0 pounds per hour (lb/hr) SO_2 and actual emissions are less than 0.02 lb/hr (see ADEQ Specific Response 2 below). Due to considerable time and effort necessary to establish an actual emissions dataset for the TO, ADEQ and FutureFuel had elected to model the worst-case, most conservative allowable emission rate. If EPA desires, ADEQ and FutureFuel can reevaluating the effort required to calculate the actual emissions from FutureFuel's TO and consider incorporated the TO's actual emissions into the final model run.*

EPA Specific Question 2 – "It is unclear if the modeled source parameters (velocity and temperature) will be single constant values or if variable stack parameters will be modeled. Please clarify what type of source parameters will be modeled and what the basis of those parameters is."

ADEQ Specific Response 2 – For FutureFuel sources, the exhaust exit velocity and temperature are modeled as constant values based on recent stack test measured values; FutureFuel does not have continuous monitoring of exhaust conditions on any unit and all the modeled units run at essentially stable conditions. Entergy Independence stack parameters are variable hourly values derived from the facility CEM system. Documentation of the sources of the constant stack parameters will be provided in the Final Attainment Demonstration Modeling Report.

EPA Specific Question 3 – "Please provide additional information regarding the five emission sources located at the Future Fuels facility that are excluded from the modeling analysis – including source type and any associated operational limits that exist for those units (e.g., permit limits on hours of operation)."

ADEQ Specific Response 2 – For clarification, our SO_2 Designation AERMOD Modeling Protocol and Model Clearinghouse Adjusted_U Request submitted on April 27, 2016 states: "All SO_2 emitting sources at FutureFuel will be modeled except for five very small SO_2 sources (less than 3.8 lb/hr total) and per EPA's clarification memorandum, intermittent emergency sources such as an emergency diesel-fired generator and fire water pump engines.[6]". So the total number of sources not being modeled is 5 very small SO_2 sources plus 5 intermittent emergency sources as shown in Table 2 below. These excluded sources account for 1.5% of the permitted allowable SO_2 emissions and have conservative permitted allowable limits. For example, the TO and Caustic Scrubber (5N09-03) is permitted for 3.0 lb/hr SO_2, but actual emissions are less than 0.02 lb/hr SO_2. Likewise, the Isopropyl Benzene unit Flare (5N03-54) is permitted for a worst-case emission rate of 0.5 lb/hr SO_2 when the actual emissions for this unit are less than 0.02 lb/hr SO_2. If EPA desires, these sources permitted allowable emissions rates can be included in the final SO_2 attainment designation model run.*

Table 2: Model-excluded FutureFuel SO_2 sources

SN	Name	SO_2 (lb/hr)	Justification
5N09-03	Thermal Oxidizer and Caustic Scrubber	3.0 (permit limit) 0.02 (actual emissions)	Only one of two TO/scrubbers (09-02 and 09-03) is actually receiving process gas at any given time
6M06-01	#4 Boiler	0.1 (permit limit)	Natural gas boiler
6M06-02	#5 Boiler	0.2 (permit limit)	Natural gas boiler
5M04-10	Scrubber (NOBS)	0.1 (permit limit)	Source has not operated since 2009 due to ceasing production of product, although equipment remains potentially operable
5N03-54	Flare	0.5 (permit limit) 0.02 (actual emissions)	No sulfur in process. Pilot on natural gas since August 2012.
5N01-WA	Diesel Glycol Pump	These are all emergency RICE and are limited to <100 hr/yr of operation. EPA modeling guidance excludes such intermittent sources in modeling for probabilistic 1-hour standards.[8]	
7M04-HT-G01	Diesel Waste Disposal Pump		
7M04-HT-G04	Diesel Waste Disposal Pump		
6N02	Diesel Generator		
8M01	Diesel Fire Water Pump		

Sincerely,

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cc: Chuck Buttry (Trinity Consultants)
Jay Haney (ICF Jones and Stokes, Inc.)
Philip Antici (FutureFuel Chemical Company)
David Triplett (Entergy Arkansas, Inc.)

[8] https://www3.epa.gov/ttn/scram/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf